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Mineral Industry Surveys

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CHROMIUM IN OCTOBER 2002

On the basis of gross weight, consumption of chromium ferroalloys and metal in October 2002 increased 12% compared with consumption in September 2002, according to the U.S. Geological Survey.

Included in this Mineral Industry Surveys are U.S. salient chromium statistics, U.S. government stockpile inventory of chromium materials in October 2002, U.S. consumption by end use and consumer stocks of chromium ferroalloys and metal at the end of October 2002, and U.S. foreign trade data for selected chromium-containing materials in September 2002.

Update

The Institute of Medicine reported on the dietary reference intake values for chromium, a micronutrient that improves the efficiency of insulin in individuals with impaired glucose tolerance, based on the diets of healthy Americans and Canadians. Dietary reference intake values comprise recommended daily allowance, adequate intake, tolerable upper intake level, and estimated average requirement. Life stage and gender affect dietary reference intake. The Institute found that there were inadequate data to set an estimated average requirement; however, it could set an adequate intake based on average unit chromium content of balanced diets and balanced diet intakes reported by Third National Health and Nutrition Examination Survey, 1988-94. Data for chromium are not sufficient to develop a tolerable upper intake level, the highest level of intake that is likely to pose no risk, suggesting the need for caution in consuming amounts greater than the recommended daily allowance. Chromium chemical speciation (the kind of chemical species in which chromium appears) and route of exposure are important factors in chromium toxicity. Inhaled, hexavalent chromium is carcinogenic. Chromium in food is trivalent chromium that is neither toxic nor carcinogenic (Institute of Medicine, 2001, p. 1-13, 197-223).

Reference Cited

Institute of Medicine, 2001, Dietary intake references for vitamin A, vitamin K, arsenic, boron, chromium, copper iodine, iron, manganese, molybdenum, nickel, silicon, vanadium, and zinc: Washington, DC, National Academy Press, 773 p.

TABLE 1
U.S. SALIENT CHROMIUM STATISTICS 1/

(Metric tons, gross weight)

	2001	2002						
	January-December	Second quarter	August	September	Third quarter	October	January-October 2/	
Production:								
Stainless steel production 3/	1,820,000	568,000	207,000	185,000	607,000	188,000	1,830,000	
Components of U.S. supply:								
Stainless steel scrap receipts	720,000	224,000	78,500	67,400	224,000	70,800	706,000	
Stainless steel scrap consumption	1,080,000	328,000	110,000	100,000	319,000	97,000	1,020,000	
Imports for consumption:								
Chromite ore	189,000	40,500	6,220	12,000	18,900	NA	103,000	4/
Ferrochromium:								
More than 4% carbon	236,000	68,600	23,800	37,500	75,500	NA	185,000	4/
More than 3%, but not more than 4% carbon	20	--	--	--	--	NA	--	4/
More than 0.5%, but not more than 3% carbon	2,290	2,900	42	1,600	2,080	NA	7,180	4/
Not more than 0.5% carbon	17,200	3,110	582	3,420	6,770	NA	14,200	4/
Ferrochromium silicon	14,600	8,270	1,500	5,800	7,300	NA	21,000	4/
Total ferroalloy imports	271,000	82,900	25,900	48,300	91,700	NA	227,000	4/
Chromium metal 5/	8,190	2,110	520	585	1,790	NA	5,720	4/
Stainless steel	761,000	196,000	63,500	51,200	169,000	NA	582,000	4/
Stainless steel scrap	42,300	17,100	10,200	8,540	30,400	NA	58,100	4/
Distribution of U.S. supply:								
Consumption:								
Chromium ferroalloys & metal	338,000	94,500	32,200	32,100	95,400	36,100	313,000	
Exports:								
Chromite ore	61,000	18,300	345	458	1,140	NA	21,000	4/
Chromium ferroalloys:								
High-carbon ferrochromium	8,390	1,370	608	369	1,210	NA	3,440	4/
Low-carbon ferrochromium	7,880	407	86	276	519	NA	1,490	4/
Ferrochromium silicon	86	127	76	19	95	NA	240	4/
Total ferroalloy exports	16,400	1,900	771	664	1,830	NA	5,170	4/
Chromium metal	1,040	152	38	25	88	NA	363	4/
Stainless steel	249,000	66,800	35,600	29,000	86,100	NA	210,000	4/
Stainless steel scrap	438,000	111,000	20,100	22,200	69,500	NA	271,000	4/
Stocks at end of period:								
Industry:								
Chromium ferroalloys and metal, consumer	28,000	XX	13,700	13,900	XX	17,500	XX	
Government stockpile:								
Chromite ore	394,000	XX	191,000	191,000	XX	206,000	XX	
Chromium ferroalloys	811,000	XX	782,000	778,000	XX	769,000	XX	
Chromium metal	7,220	XX	7,220	7,220	XX	7,220	XX	

NA Not available. XX Not applicable. -- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ May include revised data.

3/ Data on stainless steel production reported by American Iron and Steel Institute; monthly, quarterly, and year-to-date production of stainless and heat-resisting raw steel.

4/ Includes data for January through September; October data not available.

5/ Includes waste and scrap and other.

TABLE 2
U.S. REPORTED CONSUMPTION AND STOCKS OF CHROMIUM PRODUCTS IN 2002 1/

(Metric tons, gross weight unless otherwise noted)

	September	October	January-October 2/
Consumption by end use:			
Alloy uses:			
Iron alloys:			
Steel:			
Carbon steel	425	483	4,560
High-strength low-alloy steel	1,070 r/	1,190	10,900
Stainless and heat-resisting steel	27,200	30,700	263,000
Full alloy steel	1,310	1,520	13,600
Electrical steel	W	W	W
Tool steel	456	401	4,850
Cast irons	W	W	W
Superalloys	670	757	6,660
Other alloys 3/	113 r/	140	1,230
Total	32,100	36,100	313,000
Total, chromium content	18,100	20,200	178,000
Consumption by material:			
Low-carbon ferrochromium	1,790 r/	1,720	17,200
High-carbon ferrochromium	24,900	29,900	245,000
Ferrochromium silicon	5,100	4,020	47,300
Chromium metal	254 r/	277	2,710
Chromite ore	W	W	W
Chromium-aluminum alloy	28 r/	38	397
Other chromium materials	W	W	W
Total	32,100	36,100	313,000
Total, chromium content	18,100	20,200	178,000
Consumer stocks:			
Low-carbon ferrochromium	2,300	2,820	XX
High-carbon ferrochromium	10,400	13,400	XX
Ferrochromium silicon	868	910	XX
Chromium metal	205 r/	173	XX
Chromite ore	W	W	XX
Chromium-aluminum alloy	21	15	XX
Other chromium materials	W	W	XX
Total	13,900	17,500	XX
Total, chromium content	8,250 r/	10,200	XX

r/ Revised. W Withheld to avoid disclosing company proprietary data; included in "Total." XX Not applicable.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ May include revised data.

3/ Includes welding and alloy hard-facing rods and materials, wear- and corrosion-resistant alloys, and aluminum, copper, magnetic, nickel, and other alloys.

TABLE 3
U.S. GOVERNMENT STOCKPILE INVENTORY OF CHROMIUM MATERIALS 1/ 2/

(Metric tons)

Period	Chromite ore		Chromium ferroalloys			Chromium Metal
	Chemical	Refractory	High-carbon ferro-chromium	Low-carbon ferro-chromium	Ferro-chromium silicon	
2001:						
October	192,000	202,000	561,000	243,000	9,600	7,220
November	192,000	202,000	561,000	243,000	6,970	7,220
December	192,000	202,000	561,000	243,000	6,970	7,220
2002:						
January	192,000	111,000	561,000	243,000	6,970	7,220
February	192,000	111,000	558,000	239,000	6,970	7,220
March	192,000	111,000	558,000	239,000	6,970	7,220
April	192,000	111,000	558,000	239,000	3,100	7,220
May	192,000	111,000	558,000	239,000	3,100	7,220
June	78,300	175,000	374,000	163,000	--	7,210
July	78,300	175,000	372,000	163,000	--	7,210
August	78,300	113,000	547,000	235,000	--	7,220
September	78,300	113,000	544,000	234,000	--	7,220
October	78,300	127,000	536,000	233,000	--	7,220

-- Zero.

1/ Data are rounded to no more than three significant digits.
2/ These Government stocks are reported by the Defense National Stockpile Center in Inventory of Stockpile Materials R-1, which reports uncommitted inventory. Uncommitted inventory is that inventory for which there is no sales contract. Committed inventory is that inventory for which there is a sales contract; however, the material has not yet been shipped. For chromium materials, the R-1 report includes chromium materials that (1) meet specifications and are held in excess of goal and (2) do not meet specifications and are held in excess of goal. The R-1 report excludes chromium materials that are committed and awaiting shipment.

Source: Defense National Stockpile Center.

TABLE 4
U.S. EXPORTS OF CHROMITE ORE, CHROMIUM FERROALLOYS, AND METAL 1/

Period	Chromite ore		Chromium ferroalloys 2/			Chromium metal 3/	
	Gross weight (metric tons)	Value (thousands)	Gross weight (metric tons)	Chromium content (metric tons)	Value (thousands)	Gross weight (metric tons)	Value (thousands)
2001:							
September	205	$302	408	246	$424	74	$571
October	13,000	810	689	437	611	38	570
November	550	244	851	571	750	29	430
December	168	56	232	144	186	62	490
January-December	61,000	6,680	16,400	8,800	12,500	1,040	10,700
2002:							
January	350	210	463	288	472	53	450
February	988	572	394	233	393	44	224
March	234	106	577	354	513	27	447
April	528	822	674	412	652	80	699
May	494	153	774	452	686	48	493
June	17,200	824	456	261	416	24	265
July	335	89	394	240	369	25	366
August	345	61	771	469	577	38	414
September	458	171	664	394	589	25	253
January-September	21,000	3,010	5,170	3,100	4,670	363	3,610

1/ Data are rounded to no more than three significant digits; may not add to totals shown.
2/ Includes low-, medium-, and high-carbon ferrochromium and ferrochromium silicon.
3/ Includes chromium metal waste and scrap.

Source: U.S. Census Bureau.

TABLE 5
U.S. IMPORTS FOR CONSUMPTION OF CHROMITE ORE, FERROCHROMIUM, AND CHROMIUM METAL 1/

(Metric tons)

	2001	2002			
	January-December	July	August	September	January-September 2/
Chromite ore:					
Not more than 40% chromic oxide:					
Gross weight	1,600	198	226	311	1,070
Chromic oxide content	575	75	44	103	295
More than 40% but less than 46% chromic oxide:					
Gross weight	3,100	--	20	--	10,500
Chromic oxide content	1,430	--	9	--	4,430
46% or more chromic oxide:					
Gross weight	184,000	444	5,980	11,700	91,400
Chromic oxide content	88,600	224	2,770	5,420	42,600
Total, all grades:					
Gross weight	189,000	642	6,220	12,000	103,000
Chromic oxide content	90,600	299	2,830	5,520	47,300
Ferrochromium:					
Low-carbon: 3/					
Not more than 0.5%:					
Gross weight	17,200	2,770	582	3,420	14,200
Chromium content	11,800	1,660	408	2,370	9,510
More than 0.5% but not more than 3%:					
Gross weight	2,290	435	42	1,600	7,180
Chromium content	1,440	298	25	892	4,400
Total, low-carbon:					
Gross weight	19,500	3,210	624	5,020	21,400
Chromium content	13,200	1,950	433	3,260	13,900
Medium-carbon: 4/					
Gross weight	20	--	--	--	--
Chromium content	13	--	--	--	--
High-carbon: 5/					
Gross weight	236,000	14,200	23,800	37,500	185,000
Chromium content	137,000	7,490	15,000	22,300	113,000
Total, all grades:					
Gross weight	256,000	17,400	24,400	42,500	206,000
Chromium content	150,000	9,440	15,500	25,600	127,000
Chromium metal:					
Other than waste and scrap	8,150	687	502	580	5,640
Waste and scrap	43	2	19	5	81
Total, all grades	8,190	689	520	585	5,720

-- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ May include revised data.

3/ Ferrochromium containing not more than 3% carbon.

4/ Ferrochromium containing more than 3% but not more than 4% carbon.

5/ Ferrochromium containing more than 4% carbon.

Source: U.S. Census Bureau.

TABLE 6
U.S. IMPORTS FOR CONSUMPTION OF CHROMITE ORE IN 2002, BY GRADE AND BY COUNTRY 1/

Grade and country	September			January-September 2/		
	Gross weight (metric tons)	Cr2O3 (metric tons)	Value 3/ (thousands)	Gross weight (metric tons)	Cr2O3 (metric tons)	Value 3/ (thousands)
Not more than 40% chromic oxide:						
Canada	--	--	--	38	13	$15
Philippines	294	97	$59	981	266	180
South Africa	17	6	5	46	16	13
Total	311	103	64	1,070	295	207
More than 40% but less than 46% chromic oxide, South Africa	--	--	--	10,500	4,430	697
46% or more chromic oxide						
Germany	--	--	--	18	9	5
South Africa	11,700	5,420	1,310	91,400	42,600	5,180
Total	11,700	5,420	1,310	91,400	42,600	5,180
All grades:						
Canada	--	--	--	38	13	15
Germany	--	--	--	18	9	5
Philippines	294	97	59	981	266	180
South Africa	11,700	5,420	1,310	102,000	47,000	5,890
Total	12,000	5,520	1,370	103,000	47,300	6,090

-- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ May include revised data.

3/ Customs import value generally represents a value in the foreign country and therefore excludes U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise into the United States.

Source: U.S. Census Bureau.

TABLE 7
U.S. IMPORTS FOR CONSUMPTION OF FERROCHROMIUM IN 2002, BY GRADE AND BY COUNTRY 1/

Grade and country	September			January-September 2/		
	Gross weight (metric tons)	Chromium content (metric tons)	Value 3/ (thousands)	Gross weight (metric tons)	Chromium content (metric tons)	Value 3/ (thousands)
High-carbon ferrochromium: 4/						
China	--	--	--	74	49	$85
Germany	--	--	--	6,120	4,260	2,850
Kazakhstan	11,000	7,580	$4,330	87,400	60,200	31,300
Russia	--	--	--	1,560	1,070	1,420
South Africa	17,700	9,410	4,940	71,100	36,600	17,800
Turkey	--	--	--	3,500	2,110	1,090
Venezuela	--	--	--	20	14	12
Zimbabwe	8,780	5,310	2,790	14,900	9,010	5,010
Total	37,500	22,300	12,100	185,000	113,000	59,600
Low-carbon ferrochromium: 5/						
More than 0.5% but not more than 3% carbon:						
Kazakhstan	--	--	--	1,660	1,160	1,160
Russia	--	--	--	991	695	884
South Africa	1,600	892	714	4,530	2,550	2,030
Total	1,600	892	714	7,180	4,400	4,070
Not more than 0.5% carbon:						
China	40	27	70	80	53	117
France	--	--	--	4	3	5
Germany	203	141	323	2,370	1,660	4,280
Japan	20	14	40	841	588	1,740
Kazakhstan	650	449	474	2,000	1,410	1,490
Russia	2,490	1,720	2,260	6,260	4,240	5,950
South Africa	20	14	43	2,390	1,370	1,230
Turkey	--	--	--	259	188	286
Total	3,420	2,370	3,210	14,200	9,510	15,100
All grades:						
China	40	27	70	154	102	202
France	--	--	--	4	3	5
Germany	203	141	323	8,490	5,920	7,130
Japan	20	14	40	841	588	1,740
Kazakhstan	11,700	8,030	4,800	91,100	62,700	33,900
Russia	2,490	1,720	2,260	8,810	6,010	8,250
South Africa	19,300	10,300	5,700	78,000	40,500	21,100
Turkey	--	--	--	3,760	2,300	1,380
Venezuela	--	--	--	20	14	12
Zimbabwe	8,780	5,310	2,790	14,900	9,010	5,010
Total	42,500	25,600	16,000	206,000	127,000	78,800

-- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ May include revised data.

3/ Customs import value generally represents a value in the foreign country and therefore excludes U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise into the United States.

4/ Ferrochromium containing more than 4% carbon.

5/ Ferrochromium containing not more than 3% carbon.

Source: U.S. Census Bureau.

TABLE 8
U.S. IMPORTS FOR CONSUMPTION OF CHROMIUM METAL IN 2002,
BY GRADE AND BY COUNTRY 1/

Grade and country	September		January-September 2/	
	Gross weight (metric tons)	Value 3/ (thousands)	Gross weight (metric tons)	Value 3/ (thousands)
Waste and scrap:				
Germany	5	$148	19	$349
Japan	--	--	23	154
Korea, Republic of	--	--	3	14
Netherlands	--	--	8	29
Russia	--	--	28	542
Total	5	148	81	1,090
Other than waste and scrap:				
Austria	(4/)	5	(4/)	10
Canada	(4/)	9	(4/)	9
China	184	718	1,350	5,230
France	73	669	1,270	10,300
Germany	4	86	29	495
Italy	--	--	2	92
Japan	--	--	10	136
Kazakhstan	--	--	365	1,460
Liechtenstein	--	--	(4/)	20
Netherlands	--	--	7	29
Russia	260	1,210	1,620	7,090
Singapore	2	16	2	22
Spain	--	--	(4/)	5
Switzerland	(4/)	12	(4/)	28
Taiwan	--	--	2	13
United Kingdom	58	409	972	6,220
Total	580	3,130	5,640	31,200
All grades:				
Austria	(4/)	5	(4/)	10
Canada	(4/)	9	(4/)	9
China	184	718	1,350	5,230
France	73	669	1,270	10,300
Germany	9	234	48	845
Italy	--	--	2	92
Japan	--	--	33	290
Kazakhstan	--	--	365	1,460
Korea, Republic of	--	--	3	14
Liechtenstein	--	--	(4/)	20
Netherlands	--	--	15	58
Russia	260	1,210	1,650	7,630
Singapore	2	16	2	22
Spain	--	--	(4/)	5
Switzerland	(4/)	12	(4/)	28
Taiwan	--	--	2	13
United Kingdom	58	409	972	6,220
Total	585	3,280	5,720	32,300

-- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ May include revised data.

3/ Customs import value generally represents a value in the foreign country and therefore excludes U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise into the United States.

4/ Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 9
U.S. TRADE OF STAINLESS STEEL, BY PRODUCT, IN 2002 1/

Stainless steel product	September		January-September 2/	
	Gross weight (metric tons)	Value 3/ (thousands)	Gross weight (metric tons)	Value 3/ (thousands)
Exports:				
Ingot	4,240	$6,550	20,400	$46,800
Flat-rolled (width > 600 mm)	12,200	21,300	74,800	156,000
Flat-rolled (width < 600 mm)	8,580	18,700	73,500	152,000
Bars and rods in irregular coils	78	773	1,040	4,830
Other bars and rods	989	5,620	12,100	65,200
Wire	761	5,080	8,220	55,800
Tubes, pipes, hollow profiles	2,190	9,670	20,100	85,900
Total	29,000	67,700	210,000	567,000
Stainless steel scrap	22,200	18,600	271,000	192,000
Grand total	51,200	86,300	481,000	758,000
Imports:				
Ingot	11,200	15,000	219,000	247,000
Flat-rolled (width > 600 mm)	21,400	32,600	178,000	267,000
Flat-rolled (width < 600 mm)	2,450	6,930	24,900	75,100
Bars and rods in irregular coils	3,900	6,220	41,200	67,600
Other bars and rods	5,620	12,600	52,900	121,000
Wire	2,280	7,280	21,500	67,400
Tubes, pipes, hollow profiles	4,440	17,900	45,100	180,000
Total	51,200	98,600	582,000	1,020,000
Stainless steel scrap	8,540	4,890	58,100	35,300
Grand total	59,800	104,000	640,000	1,060,000

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ May include revised data.

3/ Export value is free alongside ship (f.a.s.). Import value is Customs import value, which generally represents a value in the foreign country and therefore excludes U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise into the United States.

Source: U.S. Census Bureau.